ADDENDUM NO. 1
TO
CITY OF AUBURN, MAINE
2015 Crack Seal Project
August 17, 2015

This addendum amends and /or supplements the bid documents as indicated below. Only these items alter the bid documents. Any verbal discussions or responses are hereby declared null and void. Please acknowledge this addendum on page 7-20 of 26 of the bid documents.

Clarifications to the Bid Documents:
The following changes have been made to the Bid Documents. Either material option is acceptable:

FIBER REINFORCED LOW MODULUS OR FIBER MODIFIED ASPHALT CRACK SEALER Option 2

Description This work shall consist of the furnishing and placement of crack sealing material in the cracks of existing bituminous concrete pavement in accordance with these Special Provisions. Placement shall consist of: 1) crack cleaning and drying, 2) material preparation and application, 3) material finishing and shaping 4) barrier material and application.

Materials The sealant and equipment requirements shall be one of the following options (A or B) and shall be subject to approval by the Department prior to the start of work.

A.) Fiber Reinforced Low Modulus Crack Sealant Material:

1. Low Modulus Crack Sealant Material shall conform to AASHTO M 324, Type IV (ASTM D 6690, Type IV) and the following specification.

Cone Penetration	90 - 150
Flow @ 60°C [140ºF]	< 3.0mm [⅛ in]
Bond, non-immersed	Three 12.7mm [½ in] Specimens Pass[A] 3 cycles @ 200% extension @ -20ºF
Resilience, %	60 min
Asphalt Compatibility, ASTM D5329	Pass[B]

*A*The Development at any time during the test procedure of a crack, separation, or other opening that at any point is over 6 mm deep in the sealant or between the sealant and concrete block shall constitute failure of the test specimen. The depth of the crack, separation, or other opening shall be measured perpendicular to the side of the sealant showing the defect.

*B*There shall be no failure in adhesion, formation of any oily exudate at the interface between the sealant and asphaltic concrete or other deleterious effects on the asphaltic concrete or sealant when tested at 140ºF.

2. Fibers **-** Polyester, fully drawn.

Length	10 mm [0.4 in] (max)
Denier	15 dpf (max)
Tenacity	4 gpd (min)
Crimp	none
Color	natural

Fiber Reinforced Low Modulus Crack Sealant Material Properties:

Fiber concentration 0 to 5 % by weight of Low Modulus Crack Sealant Material; uniform dispersion of fibers

Blending of the fibers with the low modulus crack sealant material shall be in accordance with the recommendations of the manufacturer of the fibers. The % of fibers to be added will be at the Contractor's discretion with final adjustments and approval made by the Department. The asphalt-fiber compound shall be thoroughly mixed before application can begin, and continue if new material is added during the day.

Equipment Equipment used in the performance of the work shall be subject to the Resident's or authorized representative's approval and shall be maintained in a satisfactory working condition at all times.

(a) Air Compressor: Air compressors shall be portable and capable of furnishing not less than 4 yd^3 of air per minute at not less than 120 psi pressure at the nozzle. The compressor shall be equipped with traps that will maintain the compressed air free of oil and water.

(b) Sweeper: Manually operated, gas powered air-broom or self-propelled sweeper designed especially for use in cleaning pavements shall be used to remove debris, dirt, and dust from the cracks.

(c) Hot Air Lance: Should operate with propane and compressed air in

combination at 2000°F - 3000°F, exit air heated at not less than 120 psi. The lance should draw propane from no smaller than a 100 lb tank using separate hoses for propane and air draw. The lance shall be designed in such that the flame does not come in contact with the pavement. The hoses shall be wrapped together with reflectorized wrap to keep them together and to protect workers in low light situations.

(d) Hand Tools: Shall consist of V-shaped squeegee, brooms, shovels, metal bars with chisel shaped ends, and any other tools which may be satisfactorily used to accomplish this work.

(e) Melting Kettle: The unit used to melt the packaged joint sealing compound shall be a double boiler, indirect fired type. The space between inner and outer shells shall be filled with a suitable heat transfer oil or substitute having a flash point of not less than 608°F. The kettle shall be equipped with a satisfactory means of agitating and mixing the joint sealer at all times. This may be accomplished by continuous stirring with mechanically operated paddles and/or a continuous circulating gear pump attached to the heating unit. The kettle must be equipped with thermostatic control calibrated between 200°F and 550°F.

(f) Application Wand: The application wand shall apply a controlled flow of material via an insulated or heated hose. The nozzle shall distribute the material as called for in this specification. A pressure regulator shall be provided to regulate pressure at the nozzle. A bypass line into the holding tank is required for use when the nozzle is shut off.

B.) Fiber Reinforced Modified Asphalt compound consisting of:

The sealant shall be a modified asphalt-fiber compound designed specifically for improving the strength and performance of the parent asphalt sealant.

(a) The asphalt binder shall consist of a blend of neat asphalt binder, chemically modified crumb rubber (CMCR), and a polymer package, all of which meet the following specifications:

The binder will meet PG 64-28E requirements after modification including:

PG grade requirements of ASHTO M320
Requirements of AASHTO P70/MP19

Modification, at a minimum, shall consist of adding 7% crumb rubber, and the maximum particle size for the recycled tire rubber shall be 80 mesh (#80 sieve)

The asphalt supplier shall provide testing for both the neat and modified asphalt binders

See below for typical modified test results for 64-28E with crumb rubber:

DSR ORIGINAL
kPa >1.00 @ 64° C. Fail temp = 76+° C

DSR RTFO.
kPa >2.20 @ 64° C. Fail temp = 76+° C

MSCR
J_{NR}: 3.2 E <0.5% @ 64° C R3200 (Average% Recovery): >70%

DSR PAV
kPa <6000@ 64° C
Stiffness <300@ -18° C.
M-Value >0.300@ -18° C

(b) Fiber reinforcing materials shall be short-length polyester fibers having the following properties:

Length*	0.25 in. ± 0.02 in.
Elongation at Break (ASTM D2256-90)	35% ± 3%
Melting Point (ASTM D3418-82)	>475°F
Crimps/Inch (ASTM 03937-90)	None
CrossSection	Round
Denier (ASTM D1577-90)	4.5 Nominal dpf
Tensile Strength (ASTM D2256-90)	>70,000 psi
Diameter	0.0008 in.**
Specific Gravity (ASTM D792-91)	1.32 to 1.40

* At temperatures ranging from ambient to maximum finished product mix temperature
** Subject to normal variations

The modified asphalt-fiber compound shall be mixed at a rate of 8% fiber (weight to weight) of asphalt cement unless otherwise approved by the Department.

The asphalt-fiber compound shall be thoroughly mixed for a minimum of one hour before application can begin. To ensure a uniform fiber distribution in the sealant, and also to limit fluctuations in the application temperature of the blended material, the contractor must have a full melter of sealant mixed, heated to the proper application temperature, and ready for testing at the start of each work day. Once that batch of sealant is emptied from the melter, crack sealing operations will cease for the remainder of the day. No new materials will be allowed to be added to the melter during the work day under any circumstances. Minimum application temperature shall be 320°F.

The Contractor shall supply the melter unit by means of a 3,000 to 5,000 gallon bulk tanker, filled at the asphalt suppliers facility, and accompanied by the a bill of lading, and material data sheet.

A Manufacturer's certificate of material compliance will be furnished to the Department certifying conformance to the above material specifications, including the following:

- Performance Grade of Unmodified Asphalt: PG 64-28S (standard) AASHTO M-320, Table 1

- 7% chemically-modified crumb rubber (CMCR) Composed of 100% 80-mesh recycled tire rubber

- 3-4% specially formulated polymer package

- Performance Grade of Modified Asphalt: PG 64-28E (able to withstand "extremely heavy" traffic loads)

- 8% polyester reinforcing fibers

Blending of the fibers with the modified asphalt binder shall be in accordance with the recommendations of the manufacturer of the fibers, and approval made by the Department.

The contractor shall provide the Resident or authorized representative with a copy of the material manufacturer's recommendations for the sealant material being provided pertaining to heating, application, and reheating prior to the beginning of operations or the changing of materials.

Equipment Equipment used in the performance of the work required by this section of the specification shall be subject to approval by the Department, and maintained in a satisfactory working condition at all times.

(a) Air Compressor: Air compressors shall be capable of furnishing not less than 100 cubic feet of air per minute at not less than 120 psi pressure at the nozzle. The compressor shall be equipped with traps that will maintain the compressed air free of oil and water.

(b) Sweeper: Manually operated, gas powered air-broom or self-propelled sweeper designed especially for use in cleaning highway and airfield pavements shall be used to remove debris, dirt and dust from the cracks.

(c) Hot Air Lance: Should operate with propane and compressed air in combination at 2000°F - 3000°F, exit air heated at not less than 120 psi. The

lance should draw propane from no smaller than a 100 lb tank using separate hoses for propane and air draw. The lance shall be designed in such that the flame does not come in contact with the pavement. The hoses shall be wrapped together with reflectorized wrap to keep them together and to protect workers in low light situations.

(d) Melter: The unit used to melt or maintain the modified asphalt crack sealant compound shall have an approximate capacity of 1,000 gallons, and be equipped to maintain the sealant compound at the recommended application temperature. The unit shall be of the indirect fired type, and shall be equipped with a remote heat exchanger and hot oil circulation pump capable of maintaining a consistent temperature of the heat transfer oil. The heat transfer oil shall be circulated to all sides and the bottom of the tank containing the crack sealant compound making a continuous loop back to the heat exchanger and having a flash point of not less than 600°F. The melter shall be equipped with a satisfactory means of agitating the crack sealant at all times. This may be accomplished by continuous stirring with mechanically operated paddles and/or by a circulating gear pump attached to the melter. The melter must be equipped with a thermostatic control calibrated between 200°F and 550°F, and must be capable of pumping an 8% fiber content blend.

(d) Hand Tools: Shall consist of V-shaped squeegee, brooms, shovels, metal bars with chisel shaped ends, and any other tools which may be satisfactorily used to accomplish this work.

(e) Application Wand: The application wand shall apply a controlled flow of material via an insulated or heated hose. The nozzle shall distribute the material as called for in this specification. A pressure regulator shall be provided to regulate pressure at the nozzle. A bypass line into the holding tank is required for use when the nozzle is shut off.

GENERAL CONSTRUCTION REQUIREMENTS

Weather Crack Sealant Material shall not be applied on a wet surface, after sunset or before sunrise, or when the atmospheric temperature is below 50°F in a shaded area at the job site, or when weather conditions are otherwise unfavorable to proper construction procedures.

Equipment Equipment used in the performance of the work shall meet the requirements of the material and equipment option selected by the Contractor, and approved by the Department. Equipment shall be maintained in a satisfactory working condition at all times.

Preparation All cracks greater than 1/4 inch shall be blown free of loose material, dirt, vegetation, and other debris by high pressure air. Material removed from the crack shall be removed from the pavement surface by means of a

power sweeper or appropriate hand tools as required. Cracks showing evidence of vegetation after being blown out shall be additionally cleaned by appropriate hand tools and additionally blown out. All cracks must be blown and heated via the hot air lance a maximum of 5 minutes prior to the crack being sealed. Distance between the hot air lance and the crack sealing unit should be no more than 50 ft to eliminate reinvasion of water, debris, and other incompressible material. All debris, vegetation, and water shall be removed to enhance adhesion of the crack sealing material. THIS WORK SHALL NOT BE DONE IN INCLEMENT WEATHER.

Preparation and Placement of Sealer The crack sealant material shall be heated and applied at the temperature specified by the manufacturer and approved by the Resident or authorized representative. Any material that has been heated above the manufacturer's specification shall not be used. Material that is reheated or held at temperature for an extended period of time may be used as allowed by the manufacturer's specification and approval of the Resident or authorized representative. The Contractor shall provide the Resident or authorized representative with a suitable device for verifying the sealant temperature in the kettle and at the application site. Any over application or spills are to be removed to the satisfaction of the Resident or authorized representative. Any sealed areas with damaged or contaminated sealer or visible voids are to be removed, prepared and resealed at no additional cost to the Department.

Sealer shall be delivered to the crack while the cracks are still hot from the hot air lance preparation through a pressure hose line and applicator shoe. The sealer overbanding area shall be a kept to a minimum and not exceed a maximum of 1 1/2 inch wide and 3/32 inch thick. The applicator shall be followed by a V-shaped squeegee to minimize the thickness of the overband. Any loose material on the surface or in the crack, which may contaminate the crack sealer or impede bonding of the sealant to the pavement, is to be removed by hand tools prior to crack filling. No crack filling material shall be applied in a crack that is wet or where frost, snow, or ice is present. The ambient air temperature must be 50°F or higher.

Blotter material such as Glenzoil, Black Beauty or an equivalent material approved by the Department shall be provided by the Contractor and shall be applied to the crack sealer to prevent pickup and tracking. Blotter material shall be incidental to the crack seal item.

Quality of Work Excess of spilled sealer shall be removed from the pavement by approved methods and discarded. Any quality of work determined to be below normal acceptable standards will not be accepted, and will be corrected and/or replaced as directed by the Resident or authorized representative at no additional cost to the Department.

Method of Measurement Low Modulus or Fiber Modified Asphalt Crack Sealer will be measured by the pound of sealant used. The manufacturer's weights of the sealant will be accepted as the basis for measurement. The Department may, at their discretion, take material samples to verify the manufacturers weights provided.
Materials supplied by the gallon will be accompanied by a bill of lading and material certification specifying the pound per gallon conversion, and provide an accurate means to verify gallons used daily in order to accurately convert gallons to pounds.

Basis of Payment The accepted quantity of Low Modulus or Fiber Modified Asphalt Crack Sealer will be paid for at the contract unit price per pound complete in place. This price shall be full compensation for furnishing and placing crack sealer, including cleaning cracks and furnishing and placing barrier or blotter materials if necessary.